

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

I. Status of the Claims

Claims 1, 3-4, 43, and 46 are requested to be canceled.

Claim 2 are currently being amended.

Claim 49 is being added.

A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 2, 5-6, 44-45, and 47-49 are now under examination in this application.

II. Claim Rejections Under 35 U.S.C. § 112

The PTO has acknowledged that the rejection of claims 1-3 under 35 U.S.C. § 112, second paragraph is moot in view of applicants' amendments and arguments filed on July 10, 2007.

III. Amendment to the Claims

Claim 1 and its dependent claims 4, 43, and 46 have been canceled without prejudice and disclaimer solely to advance the prosecution of the present application.

Applicants have amended claim 2 to recite "wherein the polyol has an average molecular weight of from 100 to 250, and the matrix resin composition has a transition point (T_g) of 70°C to 150°C, and the matrix resin composition does not include a chain extender," therefore exclude any chain extender in the composition. The support for such amendment can be found in the specification at pages 3 – 4 and 13 – 15, for example. Claim 3 is canceled. A new claim 49 which is dependent of claim 2 is added.

IV. Claim Rejections Under 35 U.S.C. § 103

The PTO maintained the rejection of claims 1-6 and 43-48 under 35 U.S.C. § 103(a) as being unpatentable over Dexheimer (US 6,706,844 B2) in view of

Uchida (US 5,545,697), for reasons of record; and over Fujino et al (6,399,199 B1), taken alone or alternatively in view of Shimizu et al. (EP 367,014). (Office Action, pages 2-3, 2nd and 3rd paragraph.) After the entry of the amendment, only claim 2 and its dependent claims 5, 6, 44-45, and 47-48 remain rejected.

After amending the claims as set forth above, Applicants respectfully traverse the rejections for the following reasons.

1. Dexheimer 6,706,844 B2 in view of Uchida 5,545,697

The PTO stated that the rejections of the present claims over Dexheimer and Uchida are maintained for the reasons of record as set forth previously. In the Office Action dated May 3, 2006, the PTO asserted that Uchida teaches that “similar matrix material as the primary reference is notoriously well known for its usage in carbon fiber reinforced plastic material-col. 6, line 1-5; col. 19, lines 58-64.” (Office Action dated May 3, 2006, page 2, 3rd paragraph.) According to the PTO, the motivation to combine the cited references comes from the desire for reinforced plastic materials. (Id. Page 3.) Applicants respectfully disagree.

Neither Dexheimer or Uchida teaches a prepreg comprising a matrix resin composition wherein the polyol has an average molecular weight of from 100 to 250, and the matrix resin composition has a transition point (Tg) of 70°C to 150°C. Therefore the cited references do not teach each and every claim limitation of the amended claim 2.

Uchida teaches an epoxy resin composition which specifically requires the presence of an oxazolidone ring. Please see Uchida, Abstract and col. 3, and col. 19 for example. This epoxy resin is different from the polyurethane product of Dexheimer or the matrix resin in the present claim in terms of composition and properties. In this regard, the PTO has not provided a basis for the assertion of “similar matrix material as the primary reference.”

Moreover, the Uchida’s epoxy resin being used for fiber reinforced plastics does not provide motivation to an ordinary skilled in the art to make Dexheimer’s polyurethane product into the fiber reinforced plastics as presently claimed. The cited references do not provide any basis for the predicting reliably the fiber reinforced plastics in the present claims could be made similarly as described in Uchida with the Dexheimer’s polyurethane product. Therefore there is no reasonable expectation of success to arrive at the presently claimed invention by combining Dexheimer and Uchida.

Furthermore, Uchida teaches that the fiber reinforced plastic made of the epoxy resin has excellent storage stability, heat resistance, and tenacity. Please see Uchida, col. 3, lines 7-10 and lines 50-55. Having both high transition point (T_g) and enough pot life for achieving good shape memory properties is a result which is not expected from the teaching of Dexheimer and Uchida.

For the reasons set forth above, the PTO has not established a *prima facie* case of obviousness over Dexheimer and Uchida. Even if a *prima facie* case had been established, the unexpected result renders the present claims nonobvious.

2. Fujino et al, 6,399,199 B1, (Fujino), taken alone or alternatively in view of Shimizu et al (EP 367,014)

The PTO asserted that the teachings of Fujino taken alone and alternatively, in view of Shimizu would have rendered obvious the invention as claimed in present claims 1-6 and 43-48. (Office Action, page 2). In supporting this assertion, the PTO stated that Fujino teaches a prepreg for carbon fiber reinforced plastic, which comprises a matrix resin containing an isocyanate of the type contemplated by applicants, a polyol, and a bifunctional chain extender, as required by applicants in claims 1-6 and 43-48. (Office Action, pages 2-3.) The PTO also stated that Shimizu teaches an elastomeric polyurethane resin composition comprising a bifunctional diisocyanate, a polyol and a bifunctional chain extender, wherein the molar ratio of the functional groups of the diisocyanate, polyol, and chain extender is 2.00-1.10:1.00-0.10. (Office Action, page 3).

The present claims as amended effectively exclude chain extender and have additional feature that the polyol has an average molecular weight of from 100 to 250, and the matrix resin composition has a transition point (T_g) of 70°C to 150°C. Neither Fujino nor Shimizu teaches a prepreg comprising a matrix resin composition having these features. Therefore the cited references do not teach each and every claim limitation in claim 2.

The features in claim 2 distinguish the present claims over the cited references. Shimizu specifically requires a chain extender. Please see Shimizu, page 3. A chain extender had been believed to be essential conventionally. In the present claims, the prepreg comprises a matrix resin composition excluding any chain extender, therefore is advantageous because it is easy to be liquefied, and has a longer pot life and good performance in handling. (Specification, page 3.)

Also, the present claims can be distinguished over Fujino. Fujino teaches a prepreg formed by impregnating carbon fiber with an epoxy resin. Again, the epoxy resin is different from the matrix resin of the present claims in terms of composition and properties. In Fujino, the polyurethane comprising isocyanate, polyhydric alcohol, and chain extender is optionally added only for enhancing the elastic modulus. Please see Fujino, col. 21, lines 11- 15. Therefore, Fujino does not provide any basis for predicting reliably the prepreg as claimed in the present application could be made similarly. Accordingly, Fujino does not provide or suggest any reasonable expectation of success which would lead one skilled in the art to arrive at the present claims.

Furthermore, Fujino teaches that the prepreg made of the epoxy resin has excellent strength properties. Please see Fujino, Abstract, col. 3, and col. 5 for example. Having both high transition point (T_g) and enough pot life for achieving good shape memory properties is a result which is not expected from the teaching of Fujino.

For the reasons set forth above, the PTO has not established a *prima facie* case of obviousness over Fujino or Shimizu. Even if a *prima facie* case had been established, the unexpected result renders the present claims nonobvious.

IV. Double Patenting

The PTO rejected claims 1 and 2 provisionally on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of co-pending application No. 10/492,940. After the entry of the foregoing amendment, only claim 2 remains rejected on this ground.

In view of Applicants' amendment, Applicants respectfully submit that claim 2 as amended is not obvious over claim 1 of co-pending application 10/492,940. Claim 1 of the '940 application specifically requires a chain extender, whereas claim 2 of the present application does not.

Applicants therefore respectfully request the reconsideration and withdrawal of the rejection on this ground.

CONCLUSION

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. § 1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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By 

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